

# Abstract Submittal Form

JANNAF  
62nd JPM / 10<sup>th</sup> MSS / 8<sup>th</sup> LPS / 7<sup>th</sup> SPS  
Joint Subcommittee Meeting  
Nashville, TN • June 1 – 4, 2015

**Abstract Due Date: Friday, January 16, 2015**

**Fields with an asterisk (\*) are required.**

\* **Title:** Green Propellant Demonstration with Hydrazine Catalyst of F-16 Emergency Power Unit

\* Submitted to: ☐ JPM ☐ MSS ☐ LPS ☒ SPS

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## \* Approval

☐ Approved by Management (indicates required resources are available to prepare, submit, and present this paper at the above subject JANNAF Meeting)

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### Unclassified Abstract (250 – 300 words; do not include figures or tables)

\* Some space vehicle and aircraft Auxiliary Power Units (APUs) use hydrazine propellant for generating power. Hydrazine is a toxic, hazardous fuel which requires special safety equipment and processes for handling and loading. In recent years, there has been development of two green propellants that could enable their use in APU's: the Swedish LMP-103S and the Air Force Research Laboratory (AFRL) AF-M315E. While there has been work on development of these propellants for thruster applications (Prisma and Green Propulsion Infusion Mission, respectively), there has been less focus on the application to power units. Beginning in 2012, an effort was started by the Marshall Space Flight Center (MSFC) on the APU application.

The MSFC plan was to demonstrate green propellants with residual Space Shuttle hardware. The principal investigator was able to acquire a Solid Rocket Booster gas generator and an Orbiter APU. Since these test assets were limited in number, an Air Force equivalent asset was identified: the F-16 Emergency Power Unit (EPU). In June 2013, two EPU's were acquired from retired aircraft located at Davis Monthan Air Force Base. A gas generator from one of these EPU's was taken out of an assembly and configured for testing with a version of the USAF propellant with a higher water content (AF-M315EM) to reduce decomposition temperatures. Testing in November 2014 has shown that this green propellant is reactive with the Hydrazine catalyst (Shell 405) generating 300 psi of pressure with the existing F-16 EPU configuration. This paper will highlight the results of MSFC testing in collaboration with AFRL.

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